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The Use of Harmonics in 3D Magnetic Fields. S. CASPI, M. HELM, L.J. LASLETT, Lawrence Berkeley Laboratory, Berkeley, California, 94720, USA

Motivated by the need for new means for specification and determination of 3D fields that are produced by electromagnetic lens elements in the region interior to coil windings and seeking to obtain techniques that will be convenient for accurate conductor placement and dynamical study of particle motion, we have conveniently generalized the representation of a 2D magnetic field to 3D. We have shown that the 3 dimensional magnetic field components of a multipole magnet in the curl-free region near the axis r=0 can be derived from one dimensional functions $A_n(z)$ and their derivatives.

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